

# Differences in Socio-demographics Status, Risk Behaviours, Healthcare Uptake and HIV/STIs Between Brothel-based and Street-based Female Sex Workers in Yunnan, China

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## Research Article

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**Differences in socio-demographics status, risk behaviours, healthcare uptake and HIV/STIs between brothel-based and street-based female sex workers in Yunnan, China**

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1 **Abstract**

2 **Background:** Heterosexual contact is the primary mode of HIV transmission in China  
3 and commercial sex is thought to play a crucial role in China's epidemic. Female sex  
4 works (FSWs) in China tend to be either brothel-based (BSWs) or street-based (SSWs),  
5 but few studies have investigated the differences between these important segments of  
6 this difficult-to-reach, high-risk population. Our aim was to explore these differences.

7 **Methods:** A cross-sectional survey was conducted in Yunnan Province of China in  
8 partnership with a local FSW-friendly non-governmental organization. Face-to-face  
9 interviews using a structured questionnaire were conducted to collect data on  
10 socio-demographic characteristics, sex work history, sexual behaviours,  
11 HIV/STI-related knowledge, HIV testing history, and healthcare services uptake. Blood  
12 samples were taken for HIV and syphilis testing, and urine samples for gonorrhoea and  
13 chlamydia testing. Descriptive statistics were used to evaluate differences between  
14 SSWs and BSWs.

15 **Results:** A total of 185 BSWs and 129 SSWs were included in the study. SSWs were  
16 older and less educated, had more dependents and more clients, accessed fewer  
17 healthcare services, and had higher prevalence of HIV/STIs. SSWs also had similar but  
18 higher rates of consistent condom use with clients.

19 **Conclusions:** Our study provides evidence that confirms the disproportionately high  
20 vulnerability of SSWs to HIV and other STIs, underscoring the urgent need for the  
21 Chinese health and public health sectors to prioritize outreach to SSWs. Awareness and  
22 educational programs, condom distribution, testing and health check-ups should be  
23 included in a comprehensive strategy for HIV/STI prevention in this high-risk  
24 population.

25 **Keywords:** China, HIV infection, STI prevalence, epidemiology, sex workers,  
26 behaviours, healthcare services

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## 36 **1. Background**

37 Even though China has made significant progress in HIV/AIDS control and  
38 prevention, the epidemic is a continuing challenge (1). Sexual transmission is now the  
39 primary driver of China's HIV epidemic, accounting for more than 90% of new HIV  
40 nationwide (2). Although the epidemic is largely characterized by a low national  
41 prevalence of 0.037% (3), HIV prevalence among sex workers overall was 0.2% in  
42 2019(4), with certain segments of female sex workers (FSWs) having disproportionately  
43 higher prevalence (e.g., low-fee FSW at 4.7%) (5). The number of FSWs in China has  
44 been estimated to be between 2 and 20 million (6-8). However, it is a heterogeneous  
45 population, and Chinese FSW are often segmented by semi-overlapping work venue or  
46 fee level groups (5, 9, 10). Two such segments are the brothel-based sex workers  
47 (BSWs), who meet clients in various entertainment and service establishments (e.g.,  
48 bars, hotels, guesthouses, saunas, massage parlors, etc.) and street-based sex workers  
49 (SSWs), who solicit clients outside, on streets or in parks. While some studies have  
50 evaluated socio-demographic characteristics, HIV-related knowledge, risk behaviors,  
51 and prevalence of HIV/STIs among BSWs (9, 11-13), few studies have investigated the  
52 SSWs in China (5, 13-15)—their high mobility and intense secrecy because of fear of  
53 arrest and detention makes finding and engaging them in research very challenging (10).

54 Just three studies, to these authors' knowledge, have focused on comparisons of BSWs  
55 and SSWs (16-18).

56 Yunnan Province has one of the highest HIV prevalence in China. Linxiang  
57 District is one of the epidemic centers, with a population of 303,600. With a population  
58 of >300 thousand, Linxiang borders Myanmar, near Southeast Asia's Golden Triangle  
59 region, well known for opium production and trafficking. Although injecting drug use  
60 remains a significant mode of HIV transmission in the area, new cases acquired by  
61 heterosexual transmission increased from 13% in 2004 to 60% in 2008 and sex work is  
62 prevalent, fueling the concern for bridging HIV to the general population. Secondly,  
63 Linxiang District has well-established grassroots non-governmental organizations  
64 (NGOs) that have a long history of working among local FSWs and an active  
65 partnership with the local CDC, which has been actively engaged in providing  
66 healthcare to the FSWs in the region for many years.

67 Therefore, we conducted a study of BSWs and SSWs in Linxiang District, Yunnan  
68 Province, China, comparing their socio-demographic characteristics, sexual behaviours  
69 and high-risk practices, experience of verbal or physical abuse, HIV/STI-related  
70 knowledge, HIV/STI prevalence, and experience with receiving healthcare.

71

72 **2. Methods**

73 **2.1. Study design**

74 To evaluate differences between BSW and SSW we conducted a cross-sectional  
75 survey between August and September 2008 in Linxiang District Yunnan, China. This  
76 study received approval from the Yunnan Center for Disease Control and Prevention  
77 (CDC) Institutional Review Board.

78 **2.2. Study site and field management**

79 This study was conducted between August and September 2008. Four FSW peer  
80 educators who worked for one of the Linxiang NGOs were recruited to the study team.  
81 They helped in the mapping the two FSW groups, recruiting FSW to participate in the  
82 study (including collection of informed consent), and interviewing participants using a  
83 structured questionnaire. Blood and urine samples were collected by laboratory staff  
84 from the local CDC for HIV/STI testing. HIV/STI-related pre-test and post-test  
85 counselling was provided to all participants. Any participant found to have HIV/STIs  
86 were referred to free HIV and STI treatment as indicated.

87 **2.3. Mapping and sampling**

88           Based on prior work by the local CDC and the NGOs, all entertainment  
89 establishments that functioned as brothels and all locations at which the SSWs were  
90 known to solicited clients were mapped out before the survey in this study. Based on  
91 this work, the study team knew that there were 387 BSWs operating in 53  
92 establishments within four geographical blocks in the district and 148 SSWs roaming  
93 the streets in the north-western part of the district.

94           For BSWs, two of the four geographical blocks were randomly selected and all of  
95 the 21 massage salons in these blocks were recruitment sites. To avoid interfering during  
96 their working time, we conducted the interviews. For SSWs, time-location sampling  
97 (used to collect data from hard-to-reach populations and snowball sampling were  
98 adopted. To protect participant privacy, we rented a house in the district so that the  
99 interviews, which were conducted by NGO and CDC staff members, could be  
100 conducted in private.

101           Each participant was provided 20 CNY (3.5 USD) and free medical service (ie,  
102 counselling, testing, and treatment as needed) as an incentive to participate in the study.

#### 103   **2.4. Data collection**

104 For our survey of FSW participants, we used a structured questionnaire for FSWs  
105 based on the Family Health International Behavioural Surveillance Survey 2000(see the  
106 supplementary files). This instrument was used to collect data on socio-demographic  
107 characteristics, sex worker history, sex behaviours and risky practices, HIV/STI-related  
108 knowledge, risk perception, healthcare service uptake, HIV testing, and self-reported  
109 STI symptoms. Knowledge about the transmission and prevention of HIV/AIDS was  
110 measured by seven true/false/unknown questions. One point was given for each correct  
111 answer, with the total score ranging from 0 to 7 points. Knowledge about symptoms of  
112 other STIs was measured by 10 questions, with the score ranging from 0 to 10 points.  
113 Both focus group discussions and in-depth interviews with FSWs and peer educators  
114 were conducted to check the appropriateness of the questionnaire prior to its use in this  
115 study.

## 116 **2.5. Laboratory testing**

117 Blood samples were tested for HIV and syphilis. HIV was tested using an  
118 enzyme-linked immunosorbent assay (ELISA) for screening and the Western blot test  
119 for confirmation. Screening for syphilis was performed using a traditional algorithm.  
120 FSW were first screened using a rapid plasma reagin (RPR) test and if positive, a  
121 Treponema pallidum particle agglutination (TPPA) test was performed to confirm

122 syphilis. Those FSW with positive RPR and TPPA results were considered to probable  
123 active syphilis.

124 Urine samples were tested for gonorrhoea and chlamydia by real-time fluorescent  
125 quantitative polymerase chain reaction (FQ-PCR) assay.

## 126 **2.6. Variable definition**

127 The comparison was conducted between the two groups BSWs and SSWs.  
128 Outcome variables were HIV/STIs-related risks, history of sex work, HIV/STIs  
129 healthcare service, knowledge, and risk perception.

## 130 **2.7. Statistical methods**

131 Means and proportions were compared (BSWs vs. SSWs) using the t-test,  
132 Mann-Whitney U-test, and chi-square test;  $P < 0.05$  was considered statistically  
133 significant (two-sided). All analyses were performed using Statistical Package for the  
134 Social Sciences (SPSS) software (v11.5; IBM SPSS Co., USA).

## 135 **3. Results**

### 136 **3.1. Sociodemographic characteristics and sex worker history**

137 A total of 185 of a possible 196 (94.4%) BSWs and 129 of a possible 148 (87.2%)  
138 SSWs were recruited to the study. The sociodemographic characteristics of BSW and

139 SSW participants are shown in Table 1. SSWs were older and more of them were  
140 married; they had received less education and had to support more dependents than  
141 BSWs ( $P < 0.001$ ). They had begun sex work at an older age, had longer sex worker  
142 careers ( $P < 0.01$ ), and received a lower fee per client than BSWs ( $P < 0.001$ ). They  
143 also solicited many more clients per day ( $P < 0.001$ ) than their BSW counterparts.

### 144 **3.2. Sex behaviours and risky practices**

145 Risky practices and condom usage are described in Table 2. Drug use within the  
146 past year and experience of verbal or physical abuse from clients were reported in both  
147 groups (drug use: SSWs vs. BSWs = 6.1% vs. 4.5%,  $P = 0.703$ ; experience of verbal or  
148 physical abuse from clients: SSWs vs. BSWs = 35.4% vs. 45.5%,  $P = 0.078$ ). Condoms  
149 were the most used contraception method in both groups (SSWs vs. BSWs = 87.3% vs.  
150 89.1%,  $P = 0.623$ ), and 8.1% of SSWs and 19.2% of BSWs had experienced condom  
151 breakage or slippage during the previous week ( $P < 0.01$ ). The proportion of consistent  
152 condom use with clients during the previous week was higher among BSWs than among  
153 SSWs (SSWs vs. BSWs = 92.0% vs. 98.9.0%,  $P < 0.01$ ). Conversely, condom use with  
154 a boyfriend or husband was higher in SSWs than in BSWs. (condom use with a  
155 boyfriend: SSWs vs. BSWs = 42.1% vs. 31.8 %,  $P < 0.05$ ; condom use with husband:  
156 SSWs vs. BSWs = 52.8 vs. 11.5%,  $P < 0.001$ ).

157 **3.3. HIV/STI-related knowledge and risk perceptions, healthcare services, HIV**  
158 **testing, and self-reported symptoms**

159 The HIV/AIDS-related knowledge score was high in both FSW groups, with no  
160 significant difference. Conversely, the score of knowledge about STIs was low and a  
161 significant difference was found between the two groups (low grade knowledge score of  
162 STIs symptoms: SSWs vs. BSWs = 70.8 vs. 36.5%,  $P < 0.001$ ). Compared with BSWs,  
163 SSWs had received fewer HIV/STI related healthcare (ever receive any AIDS-related  
164 health service: SSWs vs. BSWs = 37.0% vs. 64.4%,  $P < 0.001$ ). About two-thirds of the  
165 subjects in both groups had had HIV testing in the past lifetime (SSWs vs. BSWs =  
166 68.5% vs. 65.5%,  $P = 0.588$ ) (Table 3).

167 In addition, 32.5% of SSWs and 37.3% of BSWs reported having had STI  
168 symptoms during the past year ( $P = 0.394$ ) (i.e., abnormal vaginal discharge, 21.4% vs.  
169 24.3%,  $P = 0.581$ ; genital ulcers, 2.4% vs. 5.1%,  $P = 0.234$ ; dysuria, 15.9% vs. 15.8%,  
170  $P = 0.990$ ; genital itch, 16.8% vs. 29.3%,  $P < 0.05$ ). The perception of risk for acquiring  
171 HIV/STIs from clients and of transmitting HIV/STIs to clients were both higher among  
172 SSWs than among BSWs (perception of risk for acquiring HIV/STIs from clients:  
173 SSWs vs. BSWs = 93.7% vs. 75.3%,  $P < 0.001$ ; 89.4% vs. 25.1%,  $P < 0.001$ .) (Table  
174 3).

175 **3.4. HIV/STIs prevalence**

176 Five of the SSWs and zero BSWs have HIV infection ( $P < 0.01$ ). Syphilis  
177 prevalence was higher in SSWs (SSWs vs. BSWs = 7.0% vs. 1.1%,  $P < 0.01$ ). Overall,  
178 37.2% of SSWs and 24.9% of BSWs were found to have HIV/STI infection (Table 4,  $P$   
179  $< 0.05$ ).

180 **4. Discussion**

181 The main finding of this study was notable differences in characteristics,  
182 behaviours, and sexual health between SSWs and BSWs. To summarize, SSWs tended  
183 to be older, married, less educated, and less engaged with healthcare services. They had  
184 been engaged in sex work for a longer period, solicited more clients each day, and  
185 charged clients lower fees. Although other risk behaviours, condom use with clients,  
186 HIV knowledge, and HIV testing were similar between the two groups, SSWs had  
187 higher rates of both HIV and STIs.

188 FSWs, and in particular SSWs, are known to be one of the most marginalized and  
189 vulnerable groups in society as they must constantly grapple with inequities, power  
190 imbalances, stigma and discrimination, violence, mental health challenges, substance  
191 use issues, and barriers to health services (19, 20). The results of our study support this

192 assessment. The women who were SSWs in our study were older and less educated,  
193 which, in Chinese society, could mean they were more vulnerable to suffer layoffs and  
194 more likely to struggle to find work. Many in this demographic who find themselves out  
195 of work turn to sex work to support their families.

196       Indeed, the results we report herein largely support and confirm the existing  
197 literature on SSW. For example, a small 2008 qualitative study by Zeng et al. among  
198 eight SSWs found that they were mostly low socio-economic status rural-to-urban  
199 migrants with low HIV awareness and prevention knowledge. Major barriers to health  
200 services uptake included stigma, fear of arrest, lack of family support, and poor  
201 financial means (13). Zhou et al. found that in a 2012 – 2013 study among 781 low-fee  
202 FSW, HIV prevalence was 4.7% and syphilis prevalence was 15.0%. Most were older,  
203 married, and less educated, and solicited clients on the street, in self-rented rooms, or in  
204 “market day” buildings, meaning that they did not work in established venues (5). In a  
205 2006 – 2007 study comparing SSW and BSW, SSW had lower educational attainment,  
206 greater responsibility for supporting family, lower fees for services, longer histories of  
207 sex work, more risk behaviours, and higher prevalence of STIs (16). Two other studies  
208 found higher rates of syphilis among SSWs compared to other groups of FSWs (17, 18).

209

210 We were surprised at the very high rates of consistent condom use reported by both  
211 BSWs and SSWs in our study compared to the literature (5, 11, 12, 16). Although SSWs  
212 in our study did report lower consistent condom use that was statistically significant  
213 (92% vs. 99% among BSW,  $P < 0.01$ ), the difference is small and may not be  
214 meaningful. These data do suggest, however, that prevention interventions among FSW  
215 in this setting may be making a positive impact and perhaps condom use in the  
216 commercial sex setting may be becoming more normalized among FSW and their  
217 clients. Nevertheless, there is room for further improvement—both BSW and SSW  
218 reported recent issues with condom breakage or slippage, and both also reported  
219 dramatically lower rates of condom use with boyfriends and husbands.

220 Because of severe stigma and discrimination, mistrust of the government, and fear  
221 of arrest and incarceration, FSWs in China are a highly mobile and hidden segment of  
222 society, especially the subgroup that is SSWs. This makes them difficult to reach with  
223 health and public health interventions and with research such as this (10). Our  
224 experience in partnering for this research with local grassroots NGO resources  
225 suggested that the involvement of such FSW-friendly NGOs and their trained and  
226 experienced peer educators is important. Many NGOs have been embedded in their  
227 communities for a long time, have taken the care to build trust and be a force for good,

228 and many are helping people deal with sensitive healthcare issues and stigmatized or  
229 even criminalized behaviors. Thus, cooperation between government sectors at all levels  
230 and NGOs working in the community level in China should be encouraged in order to  
231 improve HIV/STI prevention and care across all high-risk groups (21, 22).

232 This study had several limitations. Firstly, although this study was conducted 10  
233 years ago, the continued rise in HIV transmission via heterosexual contact means that  
234 FSW remain an important high-risk group in China's HIV epidemic even today (2, 20).  
235 Secondly, while we did use sampling techniques to recruit participants, which may have  
236 introduced some bias, no participants discontinued during the study and therefore our  
237 results did not suffer from non-response bias. Thirdly, although there was some  
238 potential for social-desirability bias due to the sensitive nature of some of the interview  
239 questions, this risk was minimized by ensuring the interviews were conducted by FSWs  
240 who were affiliated with FSW-friendly NGOs. Fourthly, it is possible that our results on  
241 HIV prevalence reflect an inability of SSWs to work in venues (i.e., to get work as  
242 BSWs) because many may disallow HIV-positive status and/or the increased likelihood  
243 of HIV-positive status among older FSWs who tended to be SSWs. Our work did not  
244 account for such a potential confounding factor. Finally, our small sample size and

245 cross-sectional design limited the generalizability of our results and precluded any  
246 evaluation of causation.

## 247 **5. Conclusion**

248 In summary, the differences we observed between BSWs and SSWs in our study  
249 were significant and confirm the disproportionately high vulnerability of SSWs to HIV  
250 and other STIs. This evidence underscores the urgent need for the Chinese health and  
251 public health sectors to prioritize outreach to SSWs. Awareness and educational  
252 programs, condom distribution, testing and health check-ups should all be part of a  
253 comprehensive strategy for HIV/STI prevention in this high-risk population.

## 254 **List of abbreviations**

255 AIDS: acquired immunodeficiency syndrome

256 BSWs: brothel-based sex workers

257 CDC: Center for Disease Control

258 CNY: Chinese Yuan

259 ELISA: enzyme-linked immunosorbent assay

260 FQ-PCR: real-time fluorescent quantitative polymerase chain reaction

- 261 FSWs: female sex workers
- 262 HIV: human immunodeficiency syndrome
- 263 NGOs: non-governmental organizations
- 264 RPR: rapid plasma regain
- 265 SPSS: Statistical Package for the Social Sciences
- 266 SSWs: street-based sex workers
- 267 STI: sexually transmitted infection
- 268 TPPA: Treponema pallidum particle agglutination
- 269 USD: United States Dollar

270 **Declarations**

271 **Ethics approval and consent to participate**

272 The research protocol was officially approved by the appropriate sectors of the Chinese  
273 government. The field surveys were conducted after obtaining approval from the Ethics  
274 Committee for the biomedical ethics review committee of Yunnan, China. Informed  
275 consent was obtained from all individual participants included in the study.

276 **Consent for publication**

277 The authors declare that the research was conducted in the absence of any commercial  
278 or financial relationships that could be construed as a potential conflict of interest.

279 **Availability of data and materials**

280 Not applicable.

281 **Conflicts of interest**

282 The author reports no conflicts of interest in this work.

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286 **Authors' contributions**

287 Cai, Liu (Yufen), and He designed the study. Cai, Liu (Yufen), and Zhang (Jianping)  
288 collected the data. Cai, Liu (Yixiao), Hu, Zhang (Jinman), and He analyzed the data. Cai,  
289 Liu (Yufen), Liu (Yixiao), Wu, and Zhang (Jinman) drafted the manuscript. He  
290 contributed to the interpretation of the results and critical revision of the manuscript for  
291 important intellectual content and approved the final version of the manuscript. All  
292 authors have read and approved the manuscript.

293

294 **Acknowledgments**

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296 International, who helped us to interview participants.

297 **Table legends**

298 Table 1. Socio-demographic characteristics of street-based and brothel-based FSWs\* in  
299 Yunnan, China, 2008.

300 Table 2. HIV/STI-related risks and history of sex work of streetbased and brothel based  
301 FSWs in Yunnan, China, 2008.

302 Table 3. HIV/STIs healthcare service, knowledge, and risk perception of street-based  
303 and brothel-based FSWs\* in Yunnan, China, 2008.

304 Table 4. HIV/STIs test results of street-based and brothel-based FSWs\* in Yunnan,  
305 China, 2008.

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